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Multiseriate ray of dicotyledons.—THOMPSON³⁷ has investigated the origin of the multiseriate ray in a number of dicotyledons. He finds that in many families (Ericaceae, Casuarinaceae, Fagaceae, Betulaceae) multiseriate rays are produced "by the breaking up of the ancestral broad compound type," a type which is much broader than either the uniseriate or multiseriate, and consists of an extensive homogeneous mass of parenchyma, such a ray as "gives to the oak wood its characteristic grain." From this origin, as the author infers, the multiseriate ray, the most recent type of ray structure, has spread throughout the wood in the higher dicotyledons. Reversions to the old compound type are to be observed in seedlings, roots, etc., of those plants characterized by multiseriate rays.—J. M. C.

The work of Chodat.—The remarkable range of work that one man may undertake is illustrated by the two most recent fascicles from the Botanical Institute of the University of Geneva. They contain six papers by CHODAT, dealing with the following subjects: an unrecognized *Rhamnus* from the Balearic Islands, which becomes *R. Ludovici Salvatoris* Chod., nom. nov.;³⁸ the occurrence of green snow on a Swiss glacier, found to be due to a *Raphidium* described as *R. Vireti* Chodat;³⁹ a description of variegated clusters of grapes, which is a problem in genetics;⁴⁰ the first of a series of studies of the Conjugales, dealing with conjugation in *Spirogyra*;⁴¹ a study, from sections, of the stem structure of *Lepidodendron Brownii*;⁴² and the description of a new genus of Cyanophyceae (*Ernstiella*).⁴³—J. M. C.

Food reserves of trees.—PRESTON and PHILLIPS⁴⁴ have investigated the question of the nature and variation of the food reserves of certain American trees, comparing their results with those obtained by European investigators, a summary of whose work they present. Starch appears to be the principal reserve according to most authorities, and in temperate climates a considerable reduction in its amount takes place during the first weeks of winter, but there is no great increase in the content of sugar except at the unfolding of buds

³⁷ THOMPSON, W. P., On the origin of the multiseriate ray of the dicotyledons. Ann. Botany **25**:1005-1014. pls. 77, 78. 1911.

³⁸ CHODAT, R., Un *Rhamnus* méconnu des Baléares. Bull. Soc. Bot. Genève II. **1**:242, 243. 1909.

³⁹ ———, Sur la neige verte du glacier d'Argentièr. *op. cit.* 294-297. figs. 4.

⁴⁰ ———, Sur des grappes de raisins panachées. *op. cit.* 359-363. figs. 3.

⁴¹ ———, Etudes sur les Conjugues. 1. Sur la copulation d'un *Spirogyra*. *op. cit.* **2**:158-167. figs. 27. 1910.

⁴² ———, L'axe du *Lepidodendron Brownii* (*Lepidostrobus Brownii* Schimpr.). *op. cit.* **3**:8-13. figs. 7. 1911.

⁴³ ———, *Ernstiella rufa* Chod. un nouveau genre de Cyanophycées coccogènes. *op. cit.* 125, 126.

⁴⁴ PRESTON, J. F., and PHILLIPS, F. J., Seasonal variation in the food reserves of trees. Forestry Quarterly **9**:231-243. 1911.

in the spring. The maximum for carbohydrate reserves for deciduous trees appears to be at the period of leaf-fall, while that for evergreens is at the opening of buds in the spring. There seems to be insufficient evidence that cellulose acts as a winter reserve.—GEO. D. FULLER.

Lens cells in plants.—The position of the investigators who contend that the lens cells occurring in the epidermis of various plants are not essentially organs of light perception will be strengthened by the results of SUMMERS,⁴⁵ for in the plants studied phototropic movement occurred only before the development of the lenslike cells. The plant studied is a native of Cape Colony, Africa, where it grows under conditions of intense insolation. The character of the epidermis changes with the age of the leaves, which, at the time the lens cells differentiate, are quite rigid. An incrustation of calcium oxalate is found upon the epidermis, and this, we are assured, functions as a protection when solar illumination becomes too strong for the plant.—GEO. D. FULLER.

Embryo sac and embryo of *Garcinia*.—A series of investigations on the embryo sac and embryo of angiosperms, by the late Dr. TREUB, has begun to appear,⁴⁶ the first paper dealing with two species of *Garcinia* (Guttiferae), *G. Kydia*, and *G. Treubii*. The details of embryo sac formation are described and illustrated, the variations being of minor importance and all referable to categories recorded among angiosperms. The most noteworthy statement is that in reference to the evidence for parthenogenesis, which may be said to be suspected rather than proved. The paper adds another angiospermous genus to those that have been investigated, and still further emphasizes the remarkable uniformity of this great group in its essential morphology.—J. M. C.

Nuclear extrusion among *Fucaceae*.—GARDNER⁴⁷ has experimented on the nuclear extrusion of six different forms of *Fucaceae*: *Fucus evanescens* f. *typicus* Kjellm., *Hesperophycus Harveyanus* Setchell and Gardner, *Pelvetiopsis limita* Gardner f. *typica* and f. *lata*, *Pelvetia fastigiata* Décne, and *Cystosira Osmundacea* Ag. Many irregularities were noted; for example, in the case of *Hesperophycus* the contents of the oogonium finally divided into two eggs, one of which included a single nucleus and the other seven nuclei; the fate of the eggs after escape from the oogonium was not followed. In the case of *Pelvetia*, the six extra nuclei are cast out between the eggs instead of on the surface.—S. YAMANOCHI.

⁴⁵ SUMMERS, F., On the occurrence of lens cells in the epidermis of *Mesembryanthemum pseudotruncatellum*. Ann. Botany **25**:1137-1145. 1911.

⁴⁶ TREUB, M., Le sac embryonnaire et l'embryon dans les angiospermes. I. *Garcinia Kydia* Roxb., *Garcinia Treubii* Pierre. Ann. Jard. Bot. Buitenzorg **24**:1-17. pls. 1-5. 1911.

⁴⁷ GARDNER, NATHANIEL LYON, Variations in nuclear extrusion among *Fucaceae*. Univ. Calif. Publ. Bot. **4**:121-136. pls. 16, 17. 1910.